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$$Cix = \int_{\infty}^x \cos x/x \, dx = \gamma + \log x - x^2/2!2 + x^4/4!4 - \dots,$$

$$Eix = \int_{\infty}^x e^{-x}/x \, dx = \gamma + \log x + x + x^2/2!2 + \dots,$$

$$Shix = \int_0^x \sinh x/x \, dx = x + x^3/3!3 + x^5/5!5 + \dots,$$

$$Chix = \int_{\infty}^x \cosh x/x \, dx = \gamma + \log x + x^2/2!2 + x^4/4!4 + \dots.$$

On account of the length of the program and the interest shown in the papers it was found necessary to adjourn at 11 P. M. until 8:30 the next morning, when the program was completed and officers were elected for the ensuing year as follows:

CHAIRMAN, C. C. VANNUYS, Professor of Physics, Colorado School of Mines.

VICE-CHAIRMAN, S. L. MACDONALD, Professor of Mathematics, Colorado A. & M. College.

SECRETARY-TREASURER, G. H. LIGHT, Assistant Professor of Mathematics, University of Colorado.

Five visitors were present and the following fifteen members: C. R. Burger, Colorado School of Mines; I. M. DeLong, University of Colorado; J. C. Fitterer, University of Wyoming; W. H. Hill, Greeley High School; O. C. Lester, University of Colorado; G. H. Light, University of Colorado; S. L. Macdonald, Colorado A. & M. College; J. Q. McNatt, Colorado Fuel & Iron Co.; O. A. Randolph, University of Colorado; C. B. Ridgaway, University of Wyoming; H. M. Showman, Colorado School of Mines; C. S. Sperry, University of Colorado; C. E. Stromquist, University of Wyoming; G. P. Unseld, Westminster High School; C. C. VanNuy, Colorado School of Mines.

G. H. LIGHT, *Secretary*.

### THIRD ANNUAL MEETING OF THE OHIO SECTION.

The third annual meeting of the Ohio Section of the Mathematical Association of America was held at the Ohio State University, Columbus, on March 29, 1918, in connection with the meetings of some sections of the Ohio College Association, and the Association of Ohio Teachers of Mathematics and Science. Chairman Forbes B. Wiley occupied the chair, being relieved by Professor R. B. Allen for an interval.

The following thirty persons were registered, all but the last eight being members of the Association:

R. B. Allen, Kenyon College; W. E. Anderson, Wittenberg College; G. N. Armstrong, Ohio Wesleyan University; C. L. Arnold, Ohio State University;

C. B. Austin, Ohio Wesleyan University; Grace M. Bareis, Ohio State University; Ethelwynn R. Beckwith, Western Reserve University; R. L. Borger, Ohio University; R. D. Bohannon, Ohio State University; W. D. Cairns, Oberlin College; William Hoover, Columbus; H. W. Kuhn, Ohio State University; G. W. McCoard, Ohio State University; Charlotte Morningstar, Ohio State University; C. C. Morris, Ohio State University; Hortense Rickard, Ohio State University; S. A. Singer, Capital University; K. D. Swartzel, Ohio State University; J. H. Weaver, Ohio State University; C. J. West, Ohio State University; R. B. Wildermuth, Capital University; Forbes B. Wiley, Denison University. Non-members: H. M. Beatty, Columbus; J. C. Boldt, Dayton (Stivers High School); Helen Carl, Columbus; J. E. Evans, Columbus; Clarice Hobensack, Columbus; J. E. Newell, Columbus; H. O. Rugg, University of Chicago; Miskel Schaeffer, Columbus.

The following program was carried out as arranged by the executive committee:

1. Chairman's Address. An Experiment with Coördinates. PROFESSOR FORBES B. WILEY, Denison University.
2. The Possibilities of a College Course in Investment Mathematics. ETHELWYNN R. BECKWITH, College for Women, Western Reserve University.
3. Discussion of preceding paper. PROFESSOR C. J. WEST, Ohio State University.
4. A Prevalent Hyperbola. PROFESSOR WILLIAM HOOVER, Columbus, O.
5. A non-Commutative and non-Associative Linear Algebra with an Application to Electricity. PROFESSOR R. L. BORGER, Ohio University.
6. The Equipment and Administration of the Mathematics Departments of the Colleges of Ohio. HORTENSE RICKARD, Ohio State University.

At 7:30 P. M. there was an informal meeting at the Ohio Union in the nature of a round table. The subject for discussion was the following:

7. Statistical Tests in Collegiate Mathematics, especially in College Algebra. Leaders of Discussion, PROFESSOR H. O. RUGG, University of Chicago, PROFESSOR W. E. ANDERSON, Wittenberg College.

Twenty of those present dined together at Oxley Hall on Friday evening. Many remained and participated in the meetings of the Association of Ohio Teachers of Mathematics and Science on Saturday. The subject of chief interest to mathematicians on this program was the paper by Professor H. O. Rugg on Normal Tests in High School Algebra.

#### ABSTRACT OF PAPERS.

1. In his paper on An Experiment with Coördinates, Professor Wiley used as axes of reference, first, parallel lines and later parallel complex planes, plotting pairs of numbers as straight lines. He exhibited the graphs for the linear and special cases of the quadratic functions in two variables. Emphasis was placed upon the fact that this topic had proven to be of interest to undergraduates and had opened problems none too advanced for their investigation. The paper

aroused interest and gave rise to a twenty-minute discussion on questions suggested by it.

2. In speaking on the Possibilities of a College Course in Investment Mathematics, Mrs. Beckwith outlined a year's work for a three-hour course, covering the subjects of compound interest, annuities, bond valuation, depreciation and life insurance. This course is designed to provide the student with a knowledge of the principles of conservative investment which are of personal as well as professional value, and is being given this year in Women's College of Western Reserve University.

3. Professor West, in discussing the paper of Professor Beckwith, called attention to the difficulty of deciding on the contents of a course in the mathematics of investment. Such a course may be developed with the idea of furnishing illustrative material for mathematics, or it may be developed as a component part of a course in business administration. Professor West was of the opinion that a separate and distinct course of the first type was hardly worth while.

4. The "prevalent" hyperbola alluded to by Professor Hoover is of form  $axy + bx + ay + c = 0$ . A great variety of instances arising in the teaching and reading of pure and mixed mathematics over a considerable range were adduced from geometry, mechanics, etc. To illustrate, the locus of the feet of normals from a fixed point in the plane of a conic is of the general form above.

5. In Professor Borger's paper there is defined a particular non-associative, non-commutative linear algebra in two units and the set of theorems pertaining to it. It furnishes a vector treatment for the theory of alternating current phenomena. Steinmetz has used the complex number system of algebra to represent current and electro-motive force, but his number field was not adapted to that purpose. Professor Borger develops the algebra that is demanded, assuming the Steinmetz postulates as the required conditions for the representation of the entities involved.

6. Miss Rickard read a paper giving information in regard to the equipment and administration of the mathematics departments of colleges throughout the state. Material was obtained by means of a questionnaire sent to the heads of the departments of mathematics in Ohio colleges.

Replies had been received from only a small proportion of the colleges, but the information proved to be of so great interest that the Section asked Miss Rickard to continue her collection of data and to make a complete report next year.

7. At the round table discussion at 7:30, attended by twenty-two people, the leading feature was the talk by Professor Rugg along the lines of his well-known work on statistical standardized tests in teaching. He set forth the aims, results and limitations of standardized tests in elementary and secondary instruction and indicated their extension profitably to college algebra. A clear conception of what he would have the student attain, and ability to see the subject from the student's viewpoint, must be possessed by the successful teacher. Emphasis was laid upon four factors entering into educational tests: the pupil's ability;

the subject of instruction; the system of marking; what we mark, ability *versus* performance.

The discussion was opened by Professor W. E. Anderson, who voiced the desirability of our attempting to put into practice the suggestions of Professor Rugg in his outline of the work done in the field of mathematics. The desirability of greater uniformity and higher standards was emphasized.

The discussion was continued with interest until adjournment was necessitated by the closing of the building under the war department regime.

Secretary Cairns gave a word of greeting from the national Association. A hearty expression of thanks was voted Professor Rugg.

G. N. ARMSTRONG, *Secretary*.

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## BOOK REVIEW.

SEND ALL COMMUNICATIONS TO W. H. BUSSEY, University of Minnesota.

*Elementary Mathematical Analysis.* By JOHN WESLEY YOUNG and FRANK MILLETT MORGAN. The Macmillan Company, New York, 1917. xii + 548 pages. \$2.60.

Instructors in mathematics who are in sympathy with the recent discussions relating to the advisability of unifying the mathematics of the freshman year in college will be pleased to see this new text, for it seems to satisfy the present demand admirably. It places more emphasis "on insight and understanding of fundamental conceptions, less emphasis on algebraic technique and facility of manipulation." It provides for the general cultural aim of mathematical study by arranging the course to "cover as broad a range of mathematical concepts as possible," due consideration being given to "modern mathematical disciplines." The disciplinary value of mathematics is sought "primarily in the domain of thinking, reasoning, reflection, analysis, not in the field of memory, nor of skill in a highly specialized form of activity."

The text is distinctive in a number of respects. It embodies many features which make for economy of time and for increased efficiency. It employs progressive methods and takes advantage of recent developments in teaching freshman mathematics. The various topics of analysis are treated as belonging to a single science, and the emphasis placed upon the notion of function gives the subject a real educational and practical value. The calculus is introduced, wherever convenient, by considering the change ratio  $\Delta y/\Delta x$ .

The book is divided into five parts, of which the first deals with introductory concepts. The student is made acquainted, in Chapter I, with the fundamental idea of a mathematical function and its representation by analytic, tabular, and graphic methods. This is followed by Chapter II, on the relations of algebraic principles to geometry, which includes an excellent review of algebraic technique.